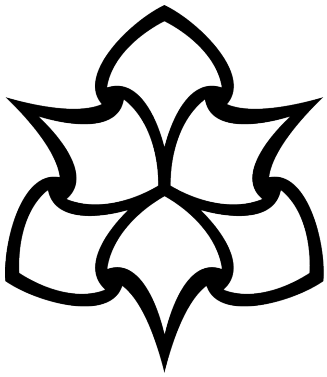

Cumulative exposure to racial discrimination across time and domains: exploring racism's long term impact on the mental health of ethnic minority people in the UK

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Abstract

Objectives: We examined the longitudinal association between cumulative exposure to racial discrimination and changes in the mental health of ethnic minority people.

Methods: We apply linear regression models to data from four waves (2009 to 2013) of the United Kingdom (UK) Household Longitudinal Study, adjusting for sex, age, household income, and previous psychological distress.

Results: Ethnic minority people who reported exposure to racial discrimination at one time point had SF-12 mental component scores 1.93 (CI= -3.31, -0.56) points lower than those who reported no exposure to racial discrimination, whereas those who had been exposed to two or more domains of racial discrimination, at two different time points, had SF-12 mental component scores 8.26 (CI= -13.33, -3.18) points lower than those who had reported no experiences of racial discrimination. Controlling for racial discrimination and other socioeconomic factors reduced ethnic inequalities in mental health.

Conclusions: Cumulative exposure to racial discrimination has incremental negative long-term effects on the mental health of ethnic minority people in the UK. Studies that examine exposure of racial discrimination at one point in time underestimate the contribution of racism on health.

Introduction

Racism is a system of structuring opportunity and assigning values to people and groups based on phenotypic properties that unfairly disadvantages some individuals and communities, while unfairly advantaging others (1). International evidence now documents that experiencing racism, either institutionally, internalised, or personally-mediated, is associated with poor health (2-7). Although the large majority of the literature is from cross-sectional studies, increasing longitudinal evidence now demonstrates that experiences of racial discrimination predate poor health (8-16), that changes in racial discrimination are associated with changes in mental health (17), and that chronic exposure to everyday racial discrimination is associated with poor sleep, coronary artery calcification (18, 19), and altered diurnal cortisol patterns and higher cortisol awakening response (20). Despite these novel insights on the longitudinal association between racial discrimination and health, there is a gap in our understanding of how the accumulation of exposure to racial discrimination over time is associated with increased morbidity. Some cross-sectional studies have shown that the accumulation of exposure to racial discrimination across domains (at work, in educational settings, while seeking health care, etc.) leads to a dose-response association between racial discrimination and poor health (21-25). However, to date, studies have modelled experiences of racial discrimination as episodic exposures, where racial discrimination is assumed to occur at one point in time, and most often within a particular domain (26). It is likely that experiencing racial discrimination has cumulative effects on health, and should therefore be conceptualised as a dynamic process that operates across time, across domains, and even across generations (26). Studies that capture exposure to racial discrimination at one point in time, and assess domains in isolation, are likely to

underestimate the overall burden of racial discrimination on the health of individuals, and its contribution to ethnic inequalities in health (27).

This study aims to address these limitations by examining the longitudinal association between cumulative exposure to racial discrimination, over time and across domains, on the mental health of ethnic minority people, and assess its contribution to ethnic inequalities in mental health in the United Kingdom (UK).

The setting of this study is UK, where ethnic inequalities in health have been consistently documented. For example, Black Caribbean, Pakistani, and Bangladeshi people have between 6 and 9 fewer years of disability-free life expectancy at birth than the White British group (28), and are up to twice as likely as white British people to report poor self-rated health and to have a limiting longstanding illness (29). Experiences of racial discrimination appear to be a key contributor to ethnic inequalities in health in the UK, the US, and elsewhere (2, 4, 7, 30, 31), but given data limitations, studies to date have not been able to fully examine longitudinal effects and whether, and how, cumulative exposure to racial discrimination leads to ethnic inequalities in health.

Methods

Data and Measures

This study uses data from all four waves of the UK Household Longitudinal Study (UKHLS), a longitudinal household panel survey of approximately 40,000 households, including an ethnic minority boost sample of around 4,000 households. The nationally representative annual survey provides longitudinal data on factors such as health, education, income, and social life (32). For each wave responses are collected over a 24-month period, conducted

face-to-face via computer aided personal interview (CAPI). The first wave of the survey was carried out in 2009-10, with subsequent waves collected in 2010-11, 2011-12, and 2012-13.

The survey consists of multiple components: a representative General Population Sample (GPS), a subset of this is the General Population Comparison (GCP) sample, an Ethnic Minority Boost (EMB) sample, and participants from the British Household Panel Survey (BHPS) from wave 2 onwards. All ethnic minority respondents and the general population comparison sample completed, in addition to the general adult questionnaire, an extra five minutes of questions covering topics such as ethnic identity, migration histories, religious behaviour, harassment, and employment discrimination. Further information on the UKHLS has been reported elsewhere (33).

Mental health

Mental health was measured using the SF-12 Mental Component Summary (MCS) (34), a measure of non-specific psychological distress which consists of twelve questions relating to the respondent's self-reported general health, health limitations, emotional problems, pain, feelings of depression, and how they interfere with social activities. Using an algorithm these items were converted into a single mental functioning score ranging from 0 (low functioning) to 100 (high functioning), with higher values indicating better mental health. The MCS uses norm-based scoring to have a mean of 50 and a standard deviation of 10 (see (35) for complete scoring details).

Racial Discrimination

Within the extra five minutes of questions, the UKHLS includes questions relating to harassment and discrimination every two years, beginning in wave one, and repeated in wave

three. This series of four questions ask respondents whether in the last 12 months they had felt unsafe; had avoided going to or being in a number of locations; had been insulted, called names, threatened or shouted at; or had been physically attacked. For each domain of racial discrimination a number of locations are listed for each of the questions, such as at school; college; work; on public transport; outside; public place; or at home. Respondents are asked to choose all that apply. The UKHLS adopts a two-stage approach, whereby after responding positively to one or any of these items, respondents are asked the reasons why these incidents occurred. Possible attributions included their sex; age; ethnicity; sexual orientation; health or disability; nationality; religion; language or accent; or dress or appearance. We recoded these variables to indicate whether the respondent had experienced feeling unsafe/ avoided a space or place/ been assaulted/ been insulted due to racial discrimination based on their ethnicity, nationality or religion. Due to the small number of respondents that stated they had been physically assaulted, this measure was combined with the indicator of verbally insults.

The UKHLS also asks about discrimination in the workplace within the last twelve months for those respondents who were employed during this time. Three questions asked whether the respondent had been turned down for a job, turned down for promotion, or turned down for job-related training. The same two-step approach was used, where the second part of the question asked respondents the attributions of why they were turned down. As with the measures of interpersonal racial discrimination, we grouped together attributions due to ethnicity, nationality or religion. Due to the small number of respondents stating they had experienced racial discrimination in the work place within the last year, these questions were combined into a single binary variable indicating any employment discrimination.

We created two cross-sectional summary variables of exposure to racial discrimination. These variables were binary and identified whether the respondent had experienced any form of racial discrimination at wave one, and wave three.

To measure cumulative experiences of racial discrimination over time, we created a longitudinal summary variable that indicated whether the respondent reported any racial discrimination (being physically or verbally insulted, feeling unsafe; avoiding a space or place; or employment discrimination) at one time point or at two time points. Categories included: no experiences of racial discrimination; experiences of racial discrimination at one time point (wave one or wave three); and experiences of racial discrimination at two time points (wave one and wave three). We also created a summary variable that combined cumulative exposure to different domains of racial discrimination across time. This dose response variable was summarised into six categories: no experiences of racial discrimination; exposure to 1 domain of racial discrimination at one time point (wave one or wave three); exposure to two or more domains of racial discrimination at one time point; exposure to 1 domain of racial discrimination at two time points (wave one and wave three); exposure to 2 or more domains of racial discrimination at one time and 1 exposure to racial discrimination at a second time point; or exposure to two or more domains of racial discrimination at two time points.

Covariates

Ethnicity was measured using a self-reported variable based on the 2011 Census categories for England and Wales. Respondents were asked to select one of the 18 categories that best described their ethnic group. In this paper we report on the ethnic minority groups with

sufficiently large samples: Indian, Pakistani, Bangladeshi, Black Caribbean and Black African. We compare these groups with the White British group.

Factors thought to be associated with both experiences of racial discrimination and mental health were considered in analytical models. These included sex, age (continuous), and equivalised household income (continuous) at wave 1. Equivalised income, a measure of socioeconomic position, is conceptualised and modelled in this study as a consequence of the discriminatory practices experienced by ethnic minority people in a range of domains, including education, residential history and employment. Equivalised household income was calculated as the sum of the gross monthly household income divided by the modified OECD scale. A small number of respondents (n=70) recorded a negative income value and so these were recoded to 0 rather than excluding them from the sample.

Analysis Plan

To examine the burden of experiencing racial discrimination on the mental health of ethnic minority people, and explore the longitudinal associations between cumulative exposure to racial discrimination and mental health, we fitted a series multiple linear regression models. The first set of linear regression models examined the association between the different measures of racial discrimination and mental health at wave four. Within each of these models we controlled for MCS scores at wave one, while adjusting for age, gender, and equivalised household income.

For the analyses that aim to model the contribution of racism to the risk of mental illness for ethnic minority people, compared with ethnic majority people, we built two linear regression models, one using cross-sectional data and the other using longitudinal data, reflecting different approaches to modelling the extent of ethnic inequality. The cross-sectional model

provides a more comprehensive account of the association between the markers of social and economic inequality and ethnic inequalities in mental health, since it describes their potential contribution to ethnic differences as observed in the population. However, because it is cross-sectional it may contain some element of reverse causation (for example, mental illness leading to lower incomes) and hence over-estimate causal effects. The longitudinal model is a stricter test of causal effects, but because it models change over four waves of data, it does not account for causal effects that will have occurred prior to the initial observation period.

We built both linear regression models in a step-wise manner. We first compared each ethnic minority group with the White British group (the reference category), adjusted for gender and age differences across ethnic groups (Step 1). Then, we included two individual markers of social and economic inequality that could be considered to be a consequence of living in a context where identities are racialised. As the first marker we use equivalised household income, our measure of socioeconomic position (Step 2). As the second marker we use reports of their exposure to racial discrimination (Step 3). The final step (Step 4) included both equivalised household income and experiences of racial discrimination.

All models were fitted in Stata v.13 (36) and included the appropriate cross-sectional and longitudinal weights to account for the stratified sample and non-response (32).

Results

Levels of psychological distress were similar for the White British (μ=49.6; SE= 0.89) and Indian groups (μ=49.4; SE= 0.51). The Black African group (μ=50.9; SE= 0.57) had significantly lower levels of distress than the White British group, whereas the Pakistani (μ=45.9; SE= 0.78), Bangladeshi (μ=46.5; SE= 1.54) and Black Caribbean groups (μ=48.3; SE= 0.60) all had significantly higher levels of distress than the White British group.

Table 1 shows the prevalence of racial harassment and discrimination experienced by ethnic minority groups at waves one and three. All ethnic minority groups reported higher levels of racial discrimination at wave three compared to those reported at wave one: more than one third of the Bangladeshi group (35%), and more than a quarter of the Indian (28%), Pakistani (27%), and Black African (26%) groups reported they had experienced some form of racial discrimination at wave three, compared to around one in five in wave one. Table 1 also shows the prevalence of cumulative exposure to racial discrimination over time and across domains at wave four. The Bangladeshi group consistently reported the highest cumulative exposure to racial discrimination across all of the domains of racial discrimination, whereas the Black Caribbean group reported the least exposure.

Table 2 shows the effects of racial discrimination on mental health. Compared with respondents who reported no experiences of racial discrimination, respondents who reported exposure to any domain of racial discrimination at one time point (either at wave one or wave three) had a deterioration in mental health scores (MCS) at wave four by 2.27 (CI= -3.42, -1.12) points. Exposure to racial discrimination at both time points reduced MCS scores by 5.78 (CI= -8.47, -3.1) points. Those who reported they had previously been insulted or attacked at one time point (either at wave one or wave three) had MCS scores 3.38 (CI= -5.1, -1.67) points lower, and those who reported exposure to racial insults or attacks at both wave one and wave 3 had MCS scores 5.03 (CI=-8.36, -1.69) points lower than those who reported they hadn't been insulted or attacked because of their ethnicity, nationality, or religion. Similar associations were found for those who reported they had felt unsafe and those who reported that they avoided places.

The final section in Table 2 shows the dose-response effects over time and across domains. Respondents that reported exposure to one domain of racial discrimination at one time point had MCS scores 1.93 (CI= -3.31, -0.56) points lower, and respondents that reported exposure to two domains of racial discrimination at two time points had MCS scores 2.98 (CI= -4.57, -1.33) points lower than those who reported no exposure to racial discrimination. Respondents who reported exposure to two domains of racial discrimination at one time point and further exposure at a second time point had MCS scores 5.65 (CI= -8.90, -2.40) points lower than those who reported no exposure to racial discrimination. Finally, those that reported two or more domains of racial discrimination at two time points had MCS scores 8.26 (CI= -13.33, -3.18) points lower than those who reported no exposure to racial discrimination.

Table 3 shows cross-sectional differences in mental health scores for each ethnic minority group, compared with the White British group. Adjusting for age and gender in Step 1 shows the significantly lower levels of average mental health scores for Pakistani, Bangladeshi and Black Caribbean people, compared with White British people. Additionally adjusting for income differences in Step 2 reduces the coefficients for the Pakistani, Bangladeshi and Black Caribbean groups substantially, and to non-significance for Pakistani and Bangladeshi people. Step 3 adjusts for exposure to racism and discrimination, and similarly reduces the negative coefficients for these three ethnic minority groups, although there remains a significant disadvantage for each of them. The final Model (Step 4) adjusts simultaneously for both income differences and racism, and in this model there are substantial reductions in the negative coefficients for the Pakistani, Bangladeshi and Black Caribbean groups. For the Pakistani and Bangladeshi groups associations become non-significant, and for the Indian and

Black Caribbean groups, we see a substantial increase in the positive coefficients. For the Black African group results show a mental health advantage, as compared to the White British group, once their economic and racism disadvantages are controlled for.

Table 4 presents findings from the model predicting longitudinal change in mental health scores. Results show that whereas change over time in mental health among Black Caribbean, Indian, and Bangladeshi people does not differ from that of White British people, inequalities in mental health become greater over time for the Pakistani group, whose SF-12 scores drop by 3.2 points (CI= -4.48, -1.93) relative to the White British group. After adjusting for socioeconomic disadvantage (Step 2) the increase in poor mental health for Pakistani people, compared with White British people is reduced, and this inequality attenuates even further after additionally adjusting for experiences of racial discrimination, although it remains statistically significant. For the Black African population we see an improvement in mental health over time, compared to the White British group, and this association strengthens as we adjust for socioeconomic disadvantage and experiences of racial discrimination (see Steps 2 to 4).

Discussion

This study set out to explore whether, and how, cumulative exposure to racial discrimination over time is associated with the mental health of ethnic minority people in the UK. In a novel contribution to the literature, we document the corrosive effect that the cumulative experience of racial discrimination has on the mental health of ethnic minority people. We found a cumulative, dose-response relationship between experiences of racial discrimination and the mental health of ethnic minority people, so that ethnic minority people who reported repeated

occurrences of racial discrimination, over time and across domains, had a reduction of 8 points on their MCS scores, compared to their peers who did not report any experiences of racial discrimination. Fear of racial discrimination expressed through reporting feeling unsafe and/or avoiding spaces or places had the biggest cumulative effect on the mental health of ethnic minority people. This finding would suggest that previous exposure to racial discrimination over the life course, or awareness of racial discrimination experienced by others, can continue to affect the mental health of ethnic minority people, even after the initial exposure to racial discrimination. Other UK-based studies have also reported the increased harm of fear of experiencing racial discrimination on health (7, 30), which likely captures not only previous experiences of racial discrimination as described above, but also the vigilance and anticipatory stress of a possible future racist encounter.

In the second part of the study we aimed to assess the contribution of racial discrimination to ethnic inequalities in mental health. We did this by modelling two different dimensions of racial disadvantage that lead to poor health: the direct experiences of racism on physiological changes (37); and the social and economic consequences of living in a racialised society (38). We found that in the cross-sectional analyses adjusting for socioeconomic disadvantage and experiences of racial discrimination eliminated ethnic inequalities in mental health for Pakistani and Bangladeshi people, and reduced inequalities for Black Caribbean people. Findings from the longitudinal analyses show that controlling for socioeconomic disadvantage and experiences of racial discrimination attenuated inequalities in mental health for Pakistani people, as compared to White British people.

Even though we analysed longitudinal data and accounted for cumulative exposure to racial discrimination over time, and across domains, we only assessed experiences of racial discrimination that participants had experienced when they were sampled by the UKHLS,

and thus we are not able to assess their previous experiences of racial discrimination or their lifetime exposure to social inequality. It has been argued elsewhere (39) that certain measures of socioeconomic disadvantage contain significant residual confounding of an underlying concept, and this is likely reflected in our results. For example income does not adequately reflect all dimensions of disadvantage and similarly, exposure to racial discrimination in the last 12 months cannot fully capture the effects of racial discrimination over the life course. It should also be recognised that socioeconomic disadvantage and racial discrimination are not evenly distributed across all ethnic minority groups and this was evidenced in our findings.

In both cross-sectional and longitudinal analyses, we found that for Black African group taking into account the harm created by racial discrimination actually improved their levels of mental health, as compared to the White British group. The health advantage of the Black African group relative to the White British group has been previously reported (29), and so it is not surprising to see this improvement increase once the effects of racialisation are accounted for. Like all of the other ethnic groups included in this study, there is great heterogeneity within the Black African group in terms of country of origin, reasons for migration, and differences in both the health and socioeconomic profiles of the individual sub-groups (40). It is therefore possible that the health advantage of the Black African group reported here is only applicable to some people within this large group.

Limitations

Even though this study is able to take advantage of longitudinal and multidimensional data, it is limited in some respects. Firstly, the UKHLS does not ask respondents about exposure to racial discrimination over their life course. Therefore we are unable to consider any of the processes or experiences of racial discrimination prior to their first interview.

Secondly, even though we are able to examine experiences across various domains of racial discrimination, the domains explored do not represent the full range of places and circumstances where racial discrimination can be experienced, and thus results presented here may underestimate the prevalence of racial discrimination experienced by ethnic minority people in the UK, and its association with mental health. And thirdly, we observe higher levels of racial discrimination at wave 3 than at wave 1, indicating possible measurement error. A previous study has reported that people who initially stated on a questionnaire that they had not experienced racial discrimination later, during an in-depth interview, said they had experienced racial discrimination but found it too difficult to discuss (29). In this case it could be that at the second interview, having been alerted to the content of the questionnaire at the previous interview, respondents were more willing to reporting experiences of racial discrimination.

Conclusions

A number of longitudinal studies show that racial discrimination predates poor health and reinforces ethnic inequalities in the health (31). In this study we confirm the longitudinal effects in a large population based study and additionally show that cumulative exposure to racial discrimination over time significantly worsens mental health. By making full use of new longitudinal data we have been able to show how repeated exposure to racial discrimination over time, and accumulation of exposure across domains, impacts on the psychological distress of ethnic minority people in the UK, and contributes to persistent ethnic inequalities in mental health. Studies that assess the cross-sectional association between racial discrimination and health, or examine exposure at one point in time,

underestimate the harm of racial discrimination on the mental health of ethnic minority people, and its contribution to ethnic inequalities in health.

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Table 1 - Prevalence of racial discrimination amongst of ethnic minority groups at Waves 1, 3 and 4

	Indian	Pakistani	Bangladeshi	Black Caribbean	Black African
	Wave 1 (Weighted %)				
Any domain of racial discrimination	20.5	17.5	21.9	14.1	22.4
Verbally or Physically assaulted	9.4	8.6	16.7	9.7	14.4
Felt unsafe	15.3	13.3	17.0	5.9	12.4
Avoided places	6.4	5.8	9.9	2.1	5.6
Job discrimination	1.1	0.4	0.3	2.5	2.6
	Wave 3 (Weighted %)				
Any domain of racial discrimination	27.6	27.2	35.1	14.4	26.0
Verbally or Physically assaulted	11.2	10.7	10.6	4.8	12.3
Felt unsafe	21.0	20.1	26.1	8.3	16.1
Avoided places	13.3	15.0	21.9	5.4	11.9
Job discrimination	1.1	0.9	1.3	1.2	1.8
	Wave 4				
	(Weighted %)				
Any domain of racial discrimination					
No exposure	62.5	61.3	58.1	76.3	60.8
1 event (1 time pt.)	26.9	32.7	26.7	19.1	29.9
2 events (2 separate time pts.)	10.6	6.0	15.2	4.6	9.3
Verbal or Physical assaulted					
No exposure	82.5	83.4	76.76	86.5	76.4
1 event (1 time pt.)	14.4	14.0	19.2	12.5	20.5
2 events (2 separate time pts.)	3.1	2.7	4.1	1.0	3.1
Felt unsafe					
No exposure	70.7	70.7	68.1	86.9	76.0
1 event (1 time pt.)	22.4	25.2	20.7	12.1	19.4
2 events (2 separate time pts.)	6.9	4.1	11.2	1.1	4.6
Avoided places					
No exposure	83.8	81.1	75.3	93.4	83.4
1 event (1 time pt.)	12.8	17.0	17.5	5.7	15.6
2 events (2 separate time pts.)	3.5	1.9	7.2	0.9	1.0

Dose-response					
No exposure to racial discrimination	62.5	61.3	58.1	76.3	60.8
1 event at 1 time pt.	16.3	17.1	12.2	14.9	18.6
2+ events at 1 time pt.	10.6	15.6	14.5	4.2	11.3
1 event at 2 time pts.	2.4	0.6	4.0	1.2	1.8
2+ events at 1 tp. and 1 event at other tp.	3.7	2.9	0.9	2.9	3.6
2+ events at 2 time pts.	4.5	2.6	10.2	0.6	3.8
Unweighted base (n)	846	627	417	502	510
Weighted base (n)	508	398	294	354	329

Table 2 – Longitudinal association between the accumulation of reported racial discrimination experienced at waves 1 and/or 3, and psychological distress (SF-12 scores) at wave 4, among ethnic minority people in Understanding Society

	Coefficient (95% CI)
Any domain of racial discrimination	
No exposure to racial discrimination	Ref.
1 event (1 time pt.)	-2.27 (-3.42, -1.12)***
2 events (2 separate time pts.)	-5.78 (-8.47, -3.10)***
Verbally or Physically assaulted	
No exposure	Ref.
1 event (1 time pt.)	-3.38 (-5.10, -1.67)***
2 events (2 separate time pts.)	-5.03 (-8.36, -1.69)**
Felt unsafe	
No exposure	Ref.
1 event (1 time pt.)	-3.11 (-4.52, -1.69)***
2 events (2 separate time pts.)	-6.36 (-10.08, -2.65***
Avoided places	
No exposure	Ref.
1 event (1 time pt.)	-2.15 (-3.62, -0.67)**
2 events (2 separate time pts.)	-8.15 (-15.50, .081)*
Dose-response	
No exposure to racial discrimination	Ref.
1 event at 1 time pt.	-1.93(-3.31, -0.56)**
2+ events at 1 time pt.	-2.98 (-4.57, -1.33)***
1 event at 2 time pts.	-1.87 (-4.90, 1.15)
2+ events at 1 tp. and 1 event at other tp.	-5.65 (-8.90, -2.40)***
2+ events at 2 time pts.	-8.26 (-13.33, -3.18)***

* p<0.05, ** p<0.01, *** p<0.001; adjusted for ethnicity, sex, age, and equivalised household income

Table 3. Ethnic inequalities in the cross-sectional association between experiences of racial discrimination and psychological distress (SF-12 scores)

	Step 1	Step 2	Step 3	Step 4
	Coefficient (95% CI)	Coefficient (95% CI)	Coefficient (95% CI)	Coefficient (95% CI)
White British	Ref.	Ref.	Ref.	Ref.
Indian	0.08 (-0.52, 0.69)	0.10 (-0.49, 0.70)	0.37 (-0.22, 0.96)	0.39 (-0.19, 0.97)
Pakistani	-1.04** (-1.76, -0.31)	-0.59 (-1.31, 0.14)	-0.77* (-1.50, -0.05)	-0.33 (-1.05, 0.39)
Bangladeshi	-1.22** (-2.11 -0.32)	-0.79 (-1.69, 0.11)	-0.95*** (-1.85, -0.05)	-0.52 (-1.43, 0.38)
Black Caribbean	-1.08*** (-1.73, -0.43)	-0.94** (-1.59, -0.29)	-0.84* (-1.50, -0.19)	-0.71* (-1.36, -0.51)
Black African	0.27 (-0.41, 0.96)	0.59 (-0.09, 1.28)	0.54 (-0.14, 1.23)	0.86** (0.19, 1.54)
Constant	50.51*** (50.20, 50.83)	49.18*** (48.81, 49.55)	50.52*** (50.20, 50.83)	49.18*** (48.81, 49.55)

* p<0.05, ** p<0.01, *** p<0.001; Step 1 controls for ethnicity, sex, and age; Step 2 controls for ethnicity, sex, age, and equivalised household income; Step 3 controls for ethnicity, sex, age, and exposure to racial discrimination; Step 4 controls for ethnicity, sex, age, equivalised household income, and exposure to racial discrimination.

Range of unweighted SF-12 scores: White British group (0-77.11); Indian group (12.08-70.46); Black African group (10.29-68.65); Pakistani group (7.95-70.45); Bangladeshi group (4.89-69.18); and Black Caribbean group (8.22-70.53).

Table 4. Ethnic inequalities in the longitudinal association between experiences of racial discrimination at waves 1 and 3, and psychological distress (SF-12 scores) at wave 4

	Step 1	Step 2	Step 3	Step 4
	Coefficient (95% CI)	Coefficient (95% CI)	Coefficient (95% CI)	Coefficient (95% CI)
White British	Ref.	Ref.	Ref.	Ref.
Indian	0.20 (-0.70, 1.10)	0.24 (-0.65, 1.14)	0.70 (-0.23, 1.64)	0.74 (-0.18, 1.66)
Pakistani	-2.15*** (-3.44, -0.85)	-1.86** (-3.15, -0.57)	-1.66* (-2.96, -0.37)	-1.38* (-2.68, -0.09)
Bangladeshi	-1.51 (-4.66, 1.64)	-1.27 (-4.44, 1.90)	-1.01 (-4.10, 2.08)	-0.48 (-0.65, 1.53)
Black Caribbean	0.08 (-1.01, 1.16)	0.15 (-0.93, 1.24)	0.37 (-0.73, 1.47)	0.41 (-0.69, 1.5)
Black African	2.17*** (1.03, 3.31)	2.38*** (1.24, 3.51)	2.71*** (1.58, 3.83)	2.90*** (1.80, 4.03)
Constant	23.85*** (22.82, 24.88)	23.27*** (22.22, 24.31)	23.89*** (22.86, 24.92)	23.31*** (22.26, 24.36)

* p<0.05, ** p<0.01, *** p<0.001; Step 1 controls for MCS score at wave 1, ethnicity, sex, and age; Step 2 controls for MCS score at wave 1, ethnicity, sex, age, and equivalised household income; Step 3 controls for MCS score at wave 1, ethnicity, sex, age, and exposure to racial discrimination; Step 4 controls for MCS score at wave 1, ethnicity, sex, age, equivalised household income, and exposure to racial discrimination.
Range of unweighted SF-12 scores: White British group (0-78.08); Indian group (12.08-71.28); Black African group (11.14-75.11); Pakistani group (9.82-75.83); Bangladeshi group (12.43-68.65); and Black Caribbean group (12.33-68.18).